

REMARKS

Claims 1 through 34 were elected by the Applicant in response to a first restriction requirement dated June 15, 2005. In response to a second restriction requirement dated September 20, 2005, the Applicant elected claims 1 through 20 and 30 through 33.

In the office action mailed November 21, 2005 the Examiner rejected claims 1 through 15 for various reasons. The Applicant has withdrawn those claims. The Applicant has also withdrawn claims 21 through 29 and claim 34. The Applicant has also cancelled claims 35 through 44.

The Examiner also stated that claims 16 through 20 would be allowable if written as independent claims. The Applicant has amended claim 16 to be stated in independent form and including the limitations of claim 1. The Applicant has made minor revision to claims 19 and 20. Claims 17 through 20 are dependant upon claim 16. It is the Applicant's position that claims 16 through 20 are now allowable.

The Examiner rejected claims 30 through 33 as obvious in view of multiple references. Quoting the relevant sections of the Examiner's rejection, the Examiner stated:

"Claims 1-7, 9-15, and 30-32 are rejected under 35 USC 103(a) as being unpatentable over Strand (US 4,768,562) in view of Nimke, McQuire (EP 0542731), and Weickmann (DE 2132310). Strand teaches a pipe relining method comprising forming a collapsible and expandable support or pipe liner, coiling said support, inserting said support into an interior annulus of a pipe, releasing a tension applied to said support (due to initial heating), and expanding said support against the wall of the pipe (Column 2, Lines 25-40 and Lines 54+). In regards to the diameter of the support in a relaxed state, Strand teaches that the outer diameter of the support is "substantially equal" to the inner diameter of the pipe (Column 2, Lines 25-32). This language would have been recognized as including embodiments in which the support has a diameter that is slightly less than and greater than the pipe diameter, wherein each of

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these embodiments are well recognized in the pipe lining industry. Nimke, McGuire and Welckmann have been applied to evidence the well known use of similar, collable pipe liners having relaxed diameters greater than the associated pipe diameter. Absent any conclusive showing of unexpected results, one of ordinary skill in the art at the time of the invention would have found it obvious to form the support with a larger diameter than the pipe.

Furthermore, in regards to inserting the support into the pipe in a coiled state, Strand does teach the support is coiled for storage and transportation (Column 1, Lines 45-51). While it is unclear if the support or liner is installed in this coiled state, it is well known to position liners within pipes in such a manner, as shown for example by Nimke. McGuire and Welckmann additionally evidence the recognized technique in which the liner is inserted into the pipe in a deformed state. Thus, one of ordinary skill in the art at the time of the invention would have found it obvious to position the support or liner of Strand within the pipe in a coiled state as it is consistent with the common technique in the pipe lining industry. It is emphasized that the liner of Strand is formed into a coiled state but it is unclear if the liner is positioned within the pipe in this state. In view of the above noted references, though, the formation of a coiled liner would have been well within the purview of one of ordinary skill in the art at the time of the invention. It is noted that such a coiling technique is seen to constitute a "tension winding" step as required by claims 30-33.

Regarding claims 2-5 and 32, the liner of Strand includes a fiber lattice that is impregnated with a thermoset or thermoplastic resin, wherein said resin is partially cured or B-staged (Column 2, Lines 25-66).

As to claims 6, 7, 9, 12, and 30-32, Strand teaches a method in which electrically conductive fibers (e.g. conductive fibers) are included in the liner or support and electrical current, from a power source, is directed

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through said fibers (Column 2, Lines 35-45 and Column 3, Lines 1-10). The reference expressly states that the heat is formed by electrical resistance heating (Column 3, lines 1-5).

Claim 33 is rejected under 35 USC 103(a) as being unpatentable over Strand, Nimke, McGuire, and Weickmann as applied in claim 30 above and further in view of Kamiyama (JP2000177010). As noted above, Strand discloses a pipe liner or support including a thermoplastic or thermoset resin (Column 2, Lines 30-40). While the reference fails to suggest specific types of resins, there are several resins that are commonly used in the pipe lining industry, including esters, as shown for example by Kamiyama (Abstract). One of ordinary skill in the art at the time of the invention would have found it obvious to use an ester resin in the method of Strand since it is recognized as a common impregnating resin in the pipe lining industry and Strand generally teaches the use of any suitable thermoplastic or thermoset resin."

The Applicant does not agree with the rejection of claims 30 through 33 and traverses the rejection. The Applicant has also amended claims 30 through 33 to require that a chemical reactant is injected into the ground as part of the pipe repair method. This limitation is not taught by the art cited by the Examiner (as the Examiner has recognized in stating that claims 16 through 20 are allowable). The method claimed is expressly stated in the original disclosure. See Page 9, beginning at line 5, stating:

"One embodiment of the apparatus and methods taught in the specification is the advantageous use of techniques for installing a thermally responsive pipe repair material (thermoset or thermoplastic impregnated liner) within the interior diameter of a sewer pipe *in combination with* injection of expanding closed cell foam proximate to the outer diameter of the sewer pipe." (emphasis original)

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See also page 24, beginning at line 1, stating:

"An alternate method and apparatus to the inflatable bladder is the utilization of a radially expanding interior support. The support taught by this specification utilizes a tensionable and compressible coil. The coil possesses a memory of its original coil radius. After the compressive means are removed, the coil returns ("relaxes") to its original radius. This characteristic is a property of material elasticity. When subjected to a stress, e.g. tensile or compressive, the dimensions of the material change, i.e., strain. For an elastic material, the strain is recovered when the stress is removed. When properly dimensioned, as taught herein, the interior pipe wall surface retains the coil in a partially tensioned state, with a residual outer pressing force. *This force, like the outward pressure of the inflated bladder, can be used to form a repair liner or surface patch within the pipe.* Unlike the bladder, the coil does not impede the flow of liquid through the pipe and can remain in the pipe as a structural support element, as well as a mechanical means to press and cure repair materials such as thermosetting or thermoplastic materials. It can also block the infiltration of injected reactant, or the resulting cured closed cell foams that are also taught by the invention.

The coil apparatus can be constructed in various forms. One embodiment may utilize a resinous plastic material having sufficient elasticity to allow compression without permanent deformation of shape. *The material may be constructed to also include electrically conductive fibers or wire that can be connected to either a dc or ac power source to provide resistive or impedance heating (generally termed resistive heating herein).* As already discussed herein, the heat may be utilized in curing or shaping thermally responsive materials that may be used in conjunction with this invention.

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The coil support structure may also have a fibrous structure that may be impregnated with resinous thermal responsive materials. These materials may be thermal plastic or thermal setting resins." (emphasis added)

See also page 10, beginning at line 5, stating:

"These conductive fibers, when powered with electric current, may provide electrically resistive or impedance heating (termed herein as 'resistive heating') directly through or immediately proximate to the thermosetting resin contained in the repair material. ...

Further, heat from the bladder or repair material is also available to radiate through the thickness of the pipe wall to facilitate the cure of the foaming liquid exterior to the pipe wall."

It is the Applicant's position that the prior art does not teach a repair method that combines electrically resistively heated tensioned support installed within a pipe and the injection of a chemical reactant into the ground. The resistive heat may be used to cure a thermally responsive material pressed within the interior pipe wall. The resistive heat may be also used to facilitate the cure or phase change of the injected chemical reactant.

The Applicant has also added new claims 45 and 46. These claims are dependant upon claim 30.

The Applicant has further added new claims 47 through 49.

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SUMMARY

The Examiner rejected claims 1 through 15. The Applicant has withdrawn those claims.

The Examiner has stated claims 16 through 20 would be allowable if amended. The Applicant has amended claim 16 to be stated in independent form. Dependent claims 19 and 20 have also been amended for clarification or to cure objectionable matter.

Claims 21 through 29 have been withdrawn.

The Examiner rejected claims 30 through 33. The Applicant has amended these claims and added two new dependant claims 45 and 46.

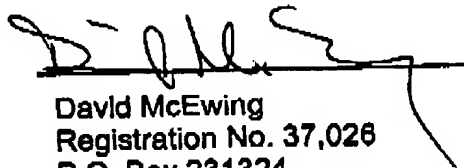
The Applicant has withdrawn claim 34.

The Applicant has cancelled claims 35 through 44.

The Applicant has further added a new independent claim 47 and two dependent claims.

The Applicant believes the amended and new claims are allowable and such action is respectfully requested. All of the Examiner's comments or rejections have been addressed. No new matter has been added.

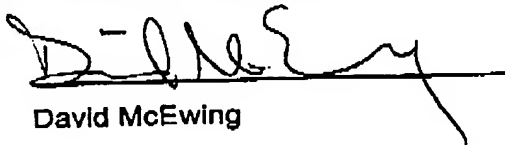
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